

Applicant: Shigeki Taira, et al.

Title: Error Correction Coding and Decoding Apparatuses

Atty Docket No. 16869S-035600

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FIG. 1

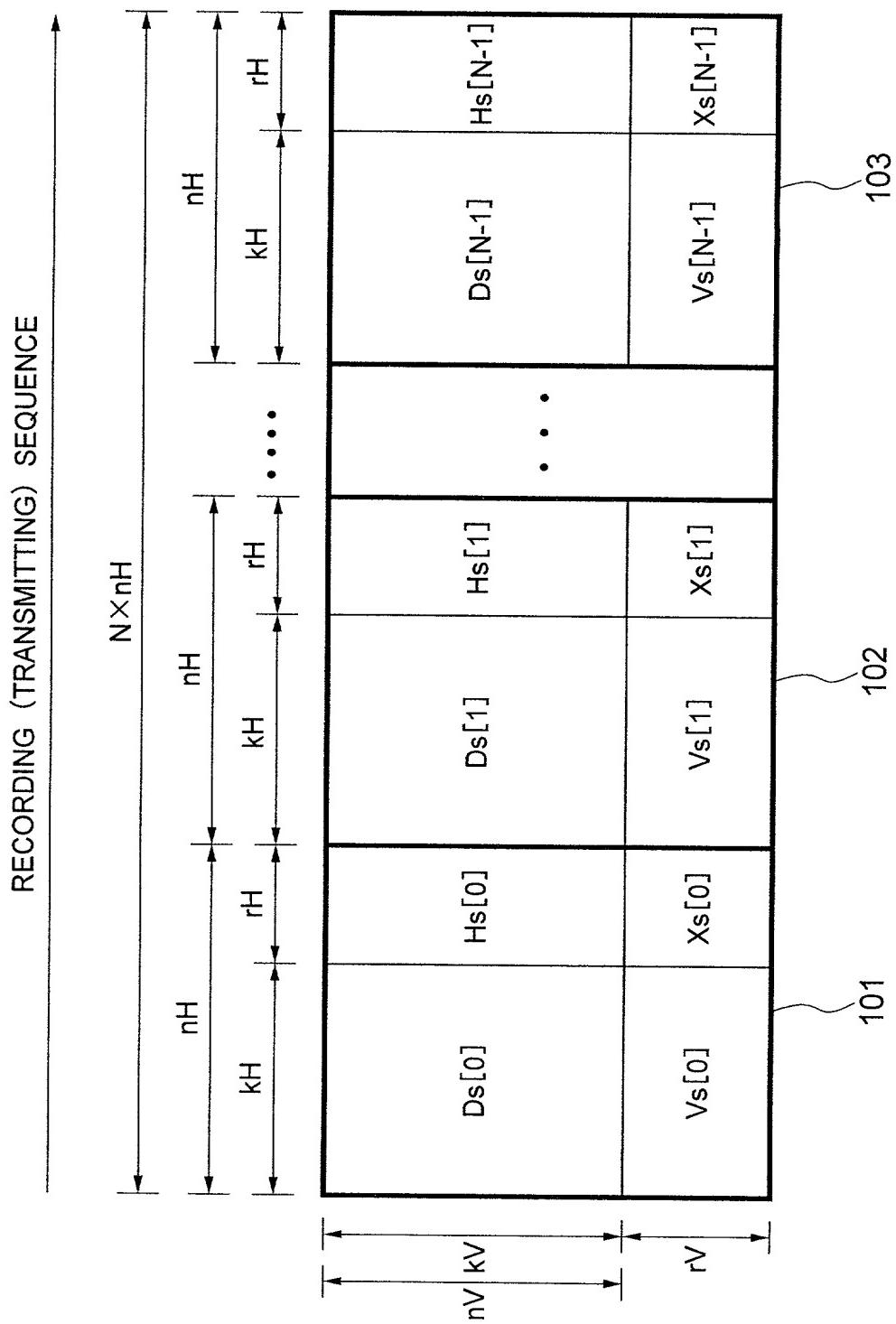


FIG. 2

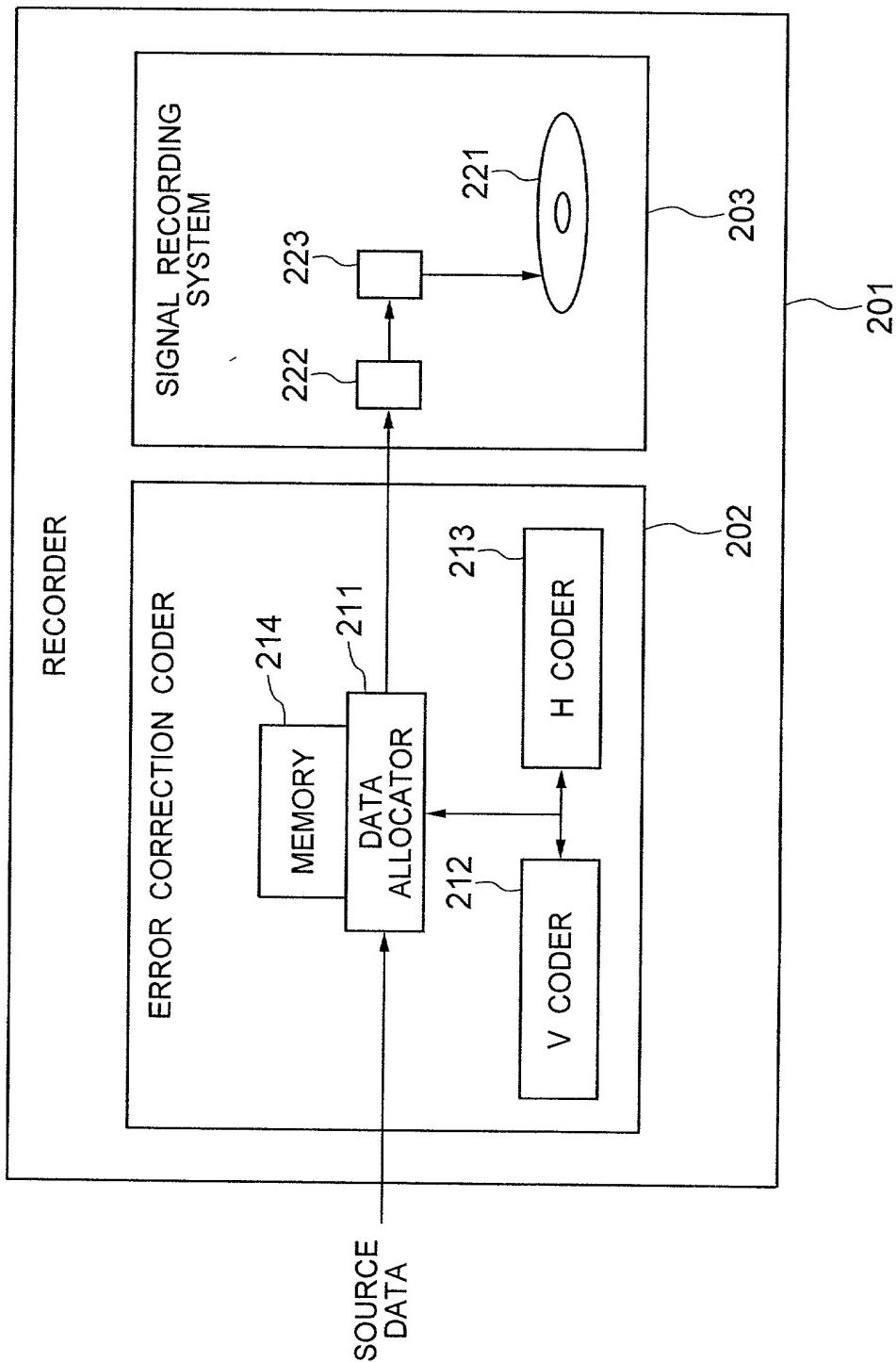


FIG. 3

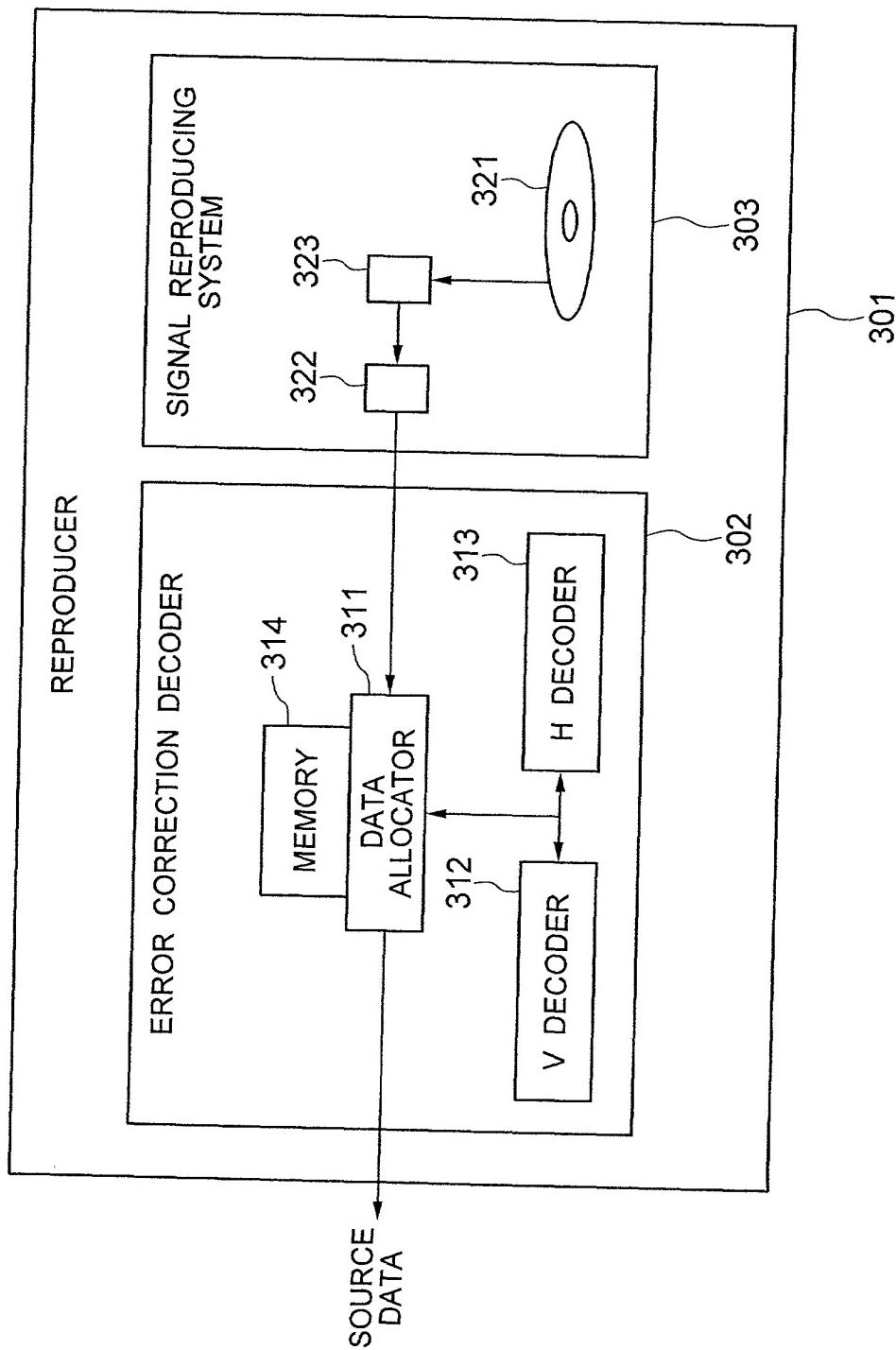


FIG. 4

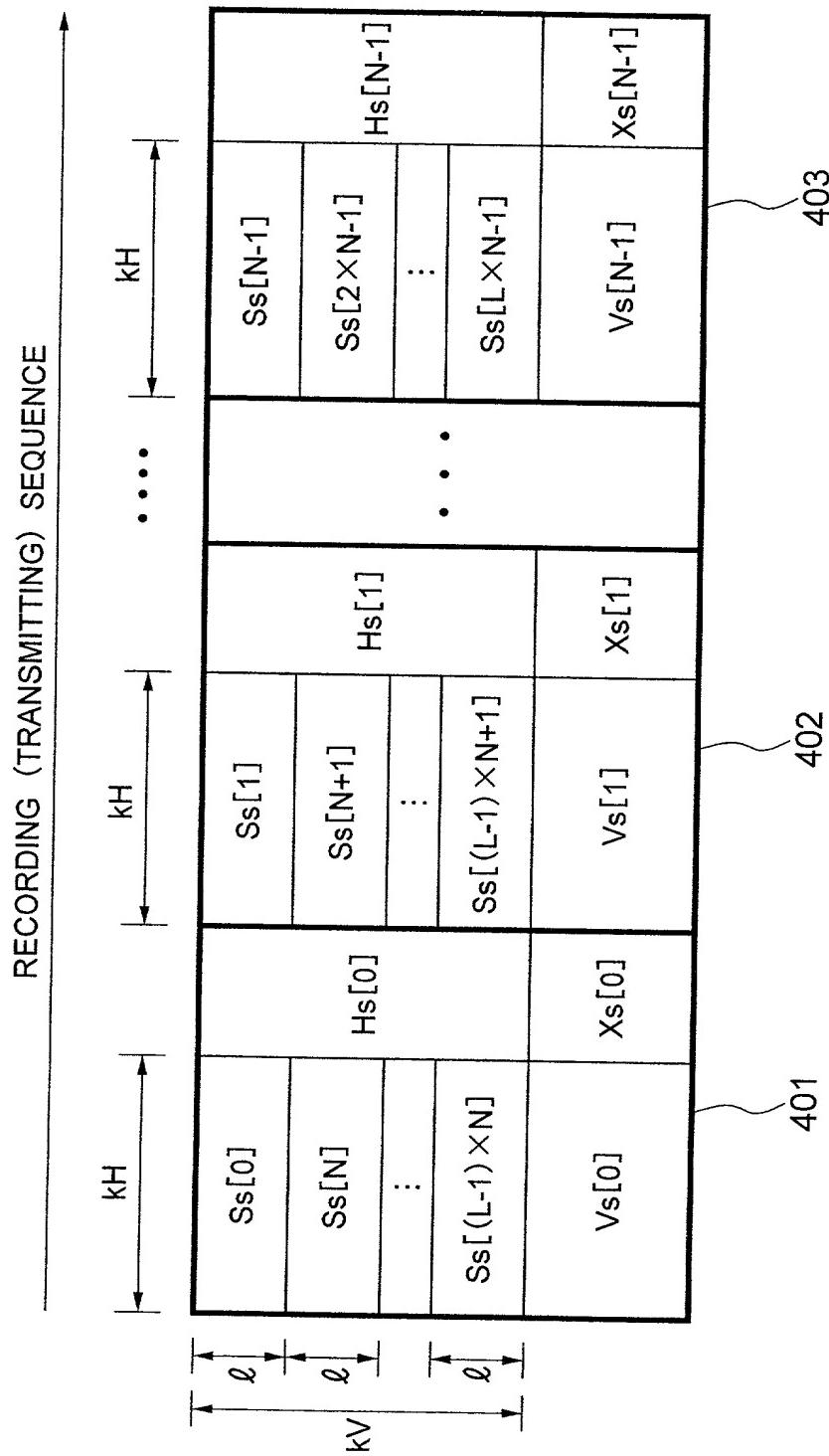
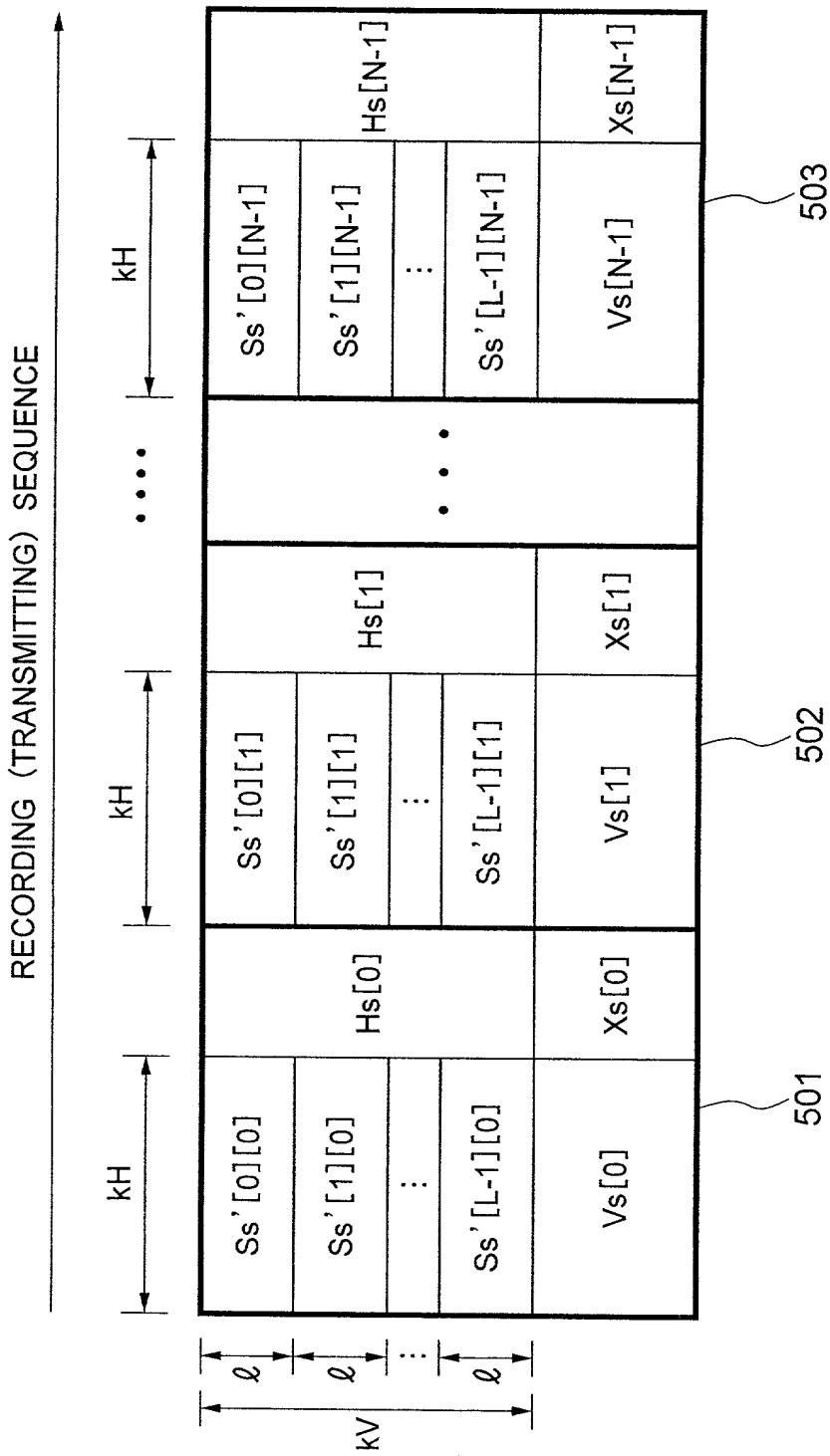
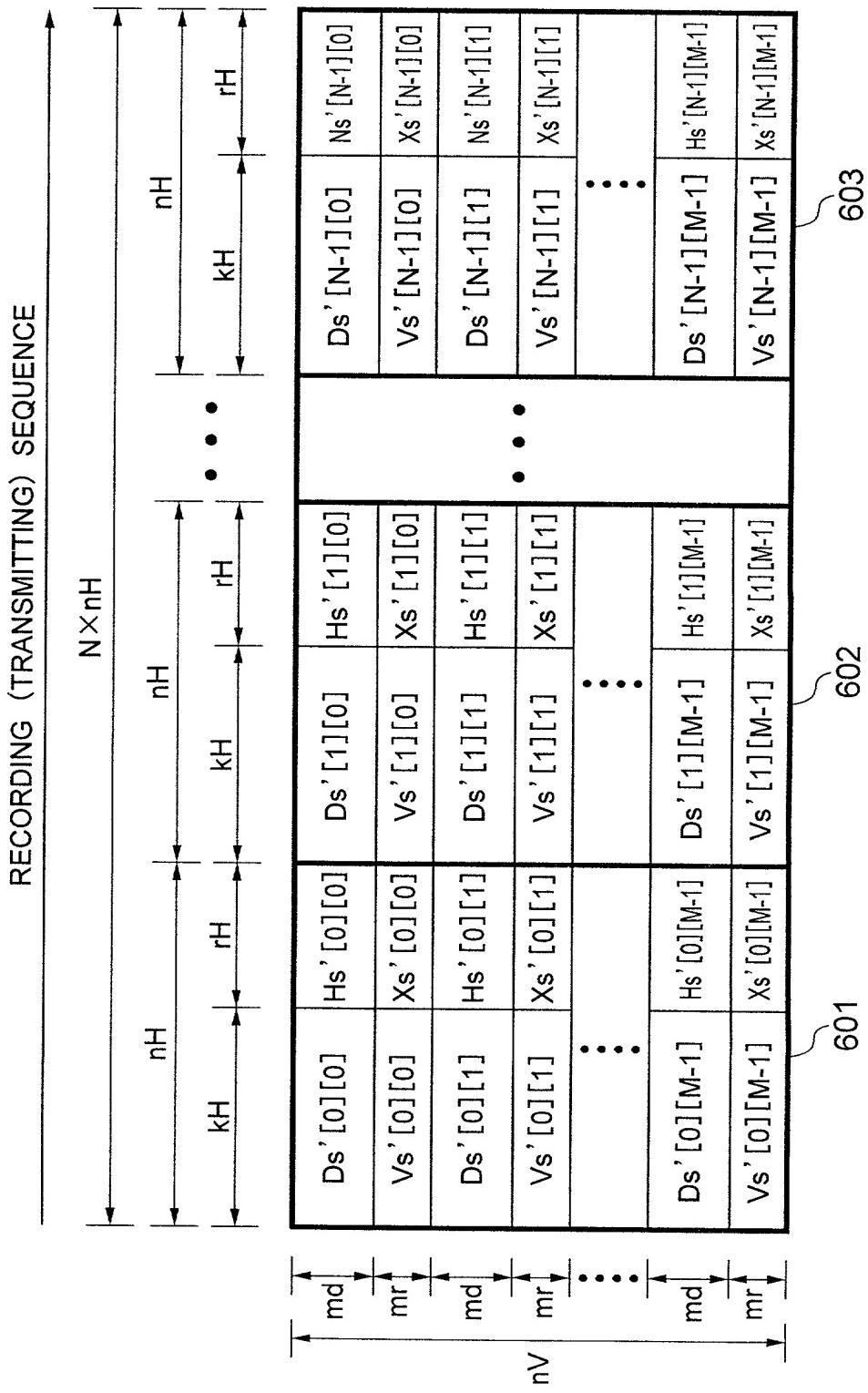


FIG. 5



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FIG. 7

RECORDING (TRANSMITTING) SEQUENCE

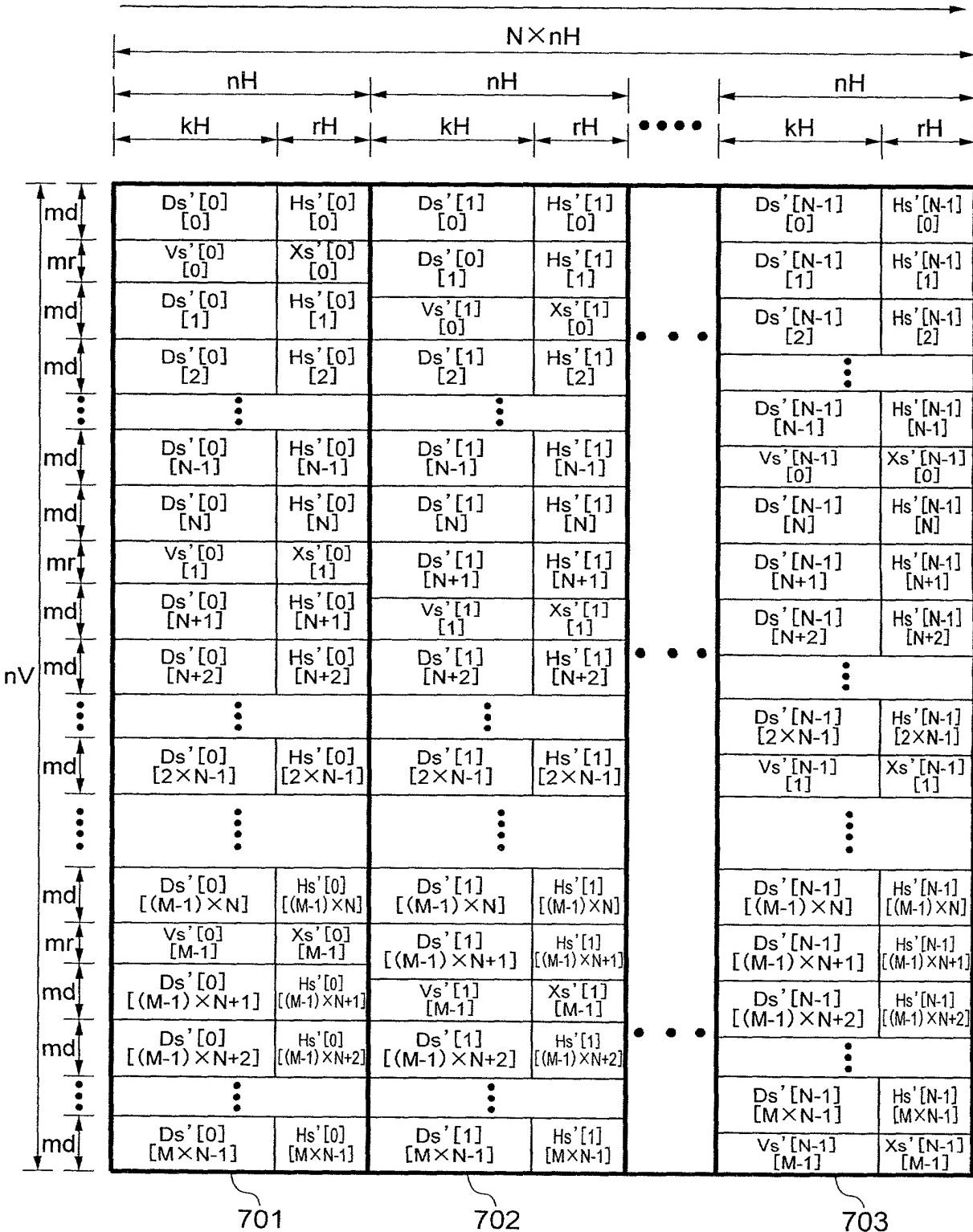


FIG. 8

RECORDING (TRANSMITTING) SEQUENCE

D[0][0]	D[0][1]	.....	D[0][171]	H1[0][0]	H1[0][1]	...	H1[0][9]	D[1][0]	D[1][1]	.....	D[1][171]	H2[0][0]	H2[0][1]	...	H2[0][9]
D[0][172]	D[0][173]	.....	D[0][343]	H1[1][0]	H1[1][1]	...	H1[1][9]	D[1][172]	D[1][173]	.....	D[1][343]	H2[1][0]	H2[1][1]	...	H2[1][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[0][1892]	D[0][1893]	.....	D[0][2063]	H1[11][0]	H1[11][1]	...	H1[11][9]	D[1][1892]	D[1][1893]	.....	D[1][2063]	H2[11][0]	H2[11][1]	...	H2[11][9]
D[2][0]	D[2][1]	.....	D[2][171]	H1[12][0]	H1[12][1]	...	H1[12][9]	D[3][0]	D[3][1]	.....	D[3][171]	H2[12][0]	H2[12][1]	...	H2[12][9]
D[2][172]	D[2][173]	.....	D[2][343]	H1[13][0]	H1[13][1]	...	H1[13][9]	D[3][172]	D[3][173]	.....	D[3][343]	H2[13][0]	H2[13][1]	...	H2[13][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[2][1892]	D[2][1893]	.....	D[2][2063]	H1[23][0]	H1[23][1]	...	H1[23][9]	D[3][1892]	D[3][1893]	.....	D[3][2063]	H2[23][0]	H2[23][1]	...	H2[23][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30][0]	D[30][1]	.....	D[30][171]	H1[180][0]	H1[180][1]	...	H1[180][9]	D[31][0]	D[31][1]	.....	D[31][171]	H2[180][0]	H2[180][1]	...	H2[180][9]
D[30][172]	D[30][173]	.....	D[30][343]	H1[181][0]	H1[181][1]	...	H1[181][9]	D[31][172]	D[31][173]	.....	D[31][343]	H2[181][0]	H2[181][1]	...	H2[181][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30][1892]	D[30][1893]	.....	D[30][2063]	H1[191][0]	H1[191][1]	...	H1[191][9]	D[31][1892]	D[31][1893]	.....	D[31][2063]	H2[191][0]	H2[191][1]	...	H2[191][9]
V1[0][0]	V1[1][0]	.....	V1[171]	X1[0][0]	X1[0][1]	...	X1[0][9]	V2[0][0]	V2[1][0]	.....	V2[171]	X2[0][0]	X2[0][1]	...	X2[0][9]
V1[0][1]	V1[1][1]	.....	V1[171]	X1[1][0]	X1[1][1]	...	X1[1][9]	V2[0][1]	V2[1][1]	.....	V2[171]	X2[1][0]	X2[1][1]	...	X2[1][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
V1[0][15]	V1[1][15]	V1[171]	X1[15][0]	X1[15][1]	...	X1[15][9]	V2[0][15]	V2[1][15]	V2[171]	X2[15][0]	X2[15][1]	...	X2[15][9]

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FIG. 9

RECORDING (TRANSMITTING) SEQUENCE →

D[0][0]	D[0][1]	D[0][171]	H1[0][0]	H1[0][1]	...	H1[0][9]	D[0][172]	D[0][173]	D[0][343]	H2[0][0]	H2[0][1]	...	H2[0][9]
D[0][344]	D[0][345]	.....	D[0][515]	H1[1][0]	H1[1][1]	...	H1[1][9]	D[0][516]	D[0][517]	.....	D[0][687]	H2[1][0]	H2[1][1]	...	H2[1][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[0][1720]	D[0][1721]	.....	D[0][1891]	H1[5][0]	H1[5][1]	...	H1[5][9]	D[0][1892]	D[0][1893]	.....	D[0][2063]	H2[5][0]	H2[5][1]	...	H2[5][9]
D[1][0]	D[1][1]	.....	D[1][171]	H1[6][0]	H1[6][1]	...	H1[6][9]	D[1][172]	D[1][173]	.....	D[1][343]	H2[6][0]	H2[6][1]	...	H2[6][9]
D[1][344]	D[1][345]	.....	D[1][515]	H1[7][0]	H1[7][1]	...	H1[7][9]	D[1][516]	D[1][517]	.....	D[1][687]	H2[7][0]	H2[7][1]	...	H2[7][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[1][1720]	D[1][1721]	.....	D[1][1891]	H1[11][0]	H1[11][1]	...	H1[11][9]	D[1][1892]	D[1][1893]	.....	D[1][2063]	H2[11][0]	H2[11][1]	...	H2[11][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[31][0]	D[31][1]	.....	D[31][171]	H1[186][0]	H1[186][1]	...	H1[186][9]	D[31][172]	D[31][173]	.....	D[31][343]	H2[186][0]	H2[186][1]	...	H2[186][9]
D[31][344]	D[31][345]	.....	D[31][515]	H1[187][0]	H1[187][1]	...	H1[187][9]	D[31][516]	D[31][517]	.....	D[31][687]	H2[187][0]	H2[187][1]	...	H2[187][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[31][1720]	D[31][1721]	.....	D[31][1891]	H1[191][0]	H1[191][1]	...	H1[191][9]	D[31][1892]	D[31][1893]	.....	D[31][2063]	H2[191][0]	H2[191][1]	...	H2[191][9]
V1[0][0]	V1[1][0]	.....	V1[171][0]	X1[0][0]	X1[0][1]	...	X1[0][9]	V2[0][0]	V2[1][0]	.....	V2[171][0]	X2[0][0]	X2[0][1]	...	X2[0][9]
V1[0][1]	V1[1][1]	.....	V1[171][1]	X1[1][0]	X1[1][1]	...	X1[1][9]	V2[0][1]	V2[1][1]	.....	V2[171][1]	X2[1][0]	X2[1][1]	...	X2[1][9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
V1[0][15]	V1[1][15]	V1[171][15]	X1[15][0]	X1[15][1]	...	X1[15][9]	V2[0][15]	V2[1][15]	V2[171][15]	X2[15][0]	X2[15][1]	...	X2[15][9]

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FIG. 10

RECORDING (TRANSMITTING) SEQUENCE →

D[0] [0]	D[0] [1]	D[0] [171]	H1[0] [0]	H1[0] [1]	...	H1[0] [9]	D[1] [0]	D[1] [1]	D[1] [171]	H2[0] [0]	H2[0] [1]	...	H2[0] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[0] [860]	D[0] [861]	.....	D[0] [1031]	H1[5] [0]	H1[5] [1]	...	H1[5] [9]	D[1] [860]	D[1] [861]	.....	D[1] [1031]	H2[5] [0]	H2[5] [1]	...	H2[5] [9]
V1[0] [0]	V1[1] [0]	.....	V1[171] [0]	X1[0] [0]	X1[0] [1]	...	X1[0] [9]	D[1] [1032]	D[1] [1033]	.....	D[1] [1203]	H2[6] [0]	H2[6] [1]	...	H2[6] [9]
D[0] [1032]	D[0] [1033]	.....	D[0] [1203]	H1[6] [0]	H1[6] [1]	...	H1[6] [9]	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	D[1] [1892]	D[1] [1893]	.....	D[1] [2063]	H2[11] [0]	H2[11] [1]	...	H2[11] [9]
D[0] [1892]	D[0] [1893]	.....	D[0] [2063]	H1[11] [0]	H1[11] [1]	...	H1[11] [9]	V2[0] [0]	V2[1] [0]	.....	V2[171] [0]	X2[0] [0]	X2[0] [1]	...	X2[0] [9]
D[2] [0]	D[2] [1]	.....	D[2] [171]	H1[12] [0]	H1[12] [1]	...	H1[12] [9]	D[3] [0]	D[3] [1]	.....	D[3] [171]	H2[12] [0]	H2[12] [1]	...	H2[12] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[2] [860]	D[2] [861]	.....	D[2] [1031]	H1[17] [0]	H1[17] [1]	...	H1[17] [9]	D[3] [860]	D[3] [861]	.....	D[3] [1031]	H2[17] [0]	H2[17] [1]	...	H2[17] [9]
V1[0] [1]	V1[1] [1]	.....	V1[171] [1]	X1[1] [0]	X1[1] [1]	...	X1[1] [9]	D[3] [1032]	D[3] [1033]	.....	D[3] [1203]	H2[18] [0]	H2[18] [1]	...	H2[18] [9]
D[2] [1032]	D[2] [1033]	.....	D[2] [1203]	H1[18] [0]	H1[18] [1]	...	H1[18] [9]	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	D[3] [1892]	D[3] [1893]	.....	D[3] [2063]	H2[23] [0]	H2[23] [1]	...	H2[23] [9]
D[2] [1892]	D[2] [1893]	.....	D[2] [2063]	H1[23] [0]	H1[23] [1]	...	H1[23] [9]	V2[0] [1]	V2[1] [1]	.....	V2[171] [1]	X2[1] [0]	X2[1] [1]	...	X2[1] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30] [0]	D[30] [1]	.....	D[30] [171]	H1[180] [0]	H1[180] [1]	...	H1[180] [9]	D[31] [0]	D[31] [1]	.....	D[31] [171]	H2[180] [0]	H2[180] [1]	...	H2[180] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30] [860]	D[30] [861]	.....	D[30] [1031]	H1[185] [0]	H1[185] [1]	...	H1[185] [9]	D[31] [860]	D[31] [861]	.....	D[31] [1031]	H2[185] [0]	H2[185] [1]	...	H2[185] [9]
V1[0] [15]	V1[1] [15]	.....	V1[171] [15]	X1[15] [0]	X1[15] [1]	...	X1[15] [9]	D[31] [1032]	D[31] [1033]	.....	D[31] [1203]	H2[186] [0]	H2[186] [1]	...	H2[186] [9]
D[30] [1032]	D[30] [1033]	.....	D[30] [1203]	H1[186] [0]	H1[186] [1]	...	H1[186] [9]	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	D[31] [1892]	D[31] [1893]	.....	D[31] [2063]	H2[191] [0]	H2[191] [1]	...	H2[191] [9]
D[30] [1892]	D[30] [1893]	D[30] [2063]	H1[191] [0]	H1[191] [1]	...	H1[191] [9]	V2[0] [15]	V2[1] [15]	V2[171] [15]	X2[15] [0]	X2[15] [1]	...	X2[15] [9]

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FIG. 11**RECORDING (TRANSMITTING) SEQUENCE** →

D[0] [0]	D[0] [1]	D[0] [171]	H1[0] [0]	H1[0] [1]	H1[0] [9]	D[0] [172]	D[0] [173]	D[0] [343]	H2[0] [0]	H2[0] [1]	H2[0] [9]
D[0] [344]	D[0] [345]	.....	D[0] [515]	H1[1] [0]	H1[1] [1]	.....	H1[1] [9]	D[0] [516]	D[0] [517]	.....	D[0] [687]	H2[1] [0]	H2[1] [1]	.....	H2[1] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[0] [1720]	D[0] [1721]	.....	D[0] [1891]	H1[5] [0]	H1[5] [1]	.....	H1[5] [9]	D[0] [1892]	D[0] [1893]	.....	D[0] [2063]	H2[5] [0]	H2[5] [1]	.....	H2[5] [9]
V1[0] [0]	V1[1] [0]	.....	V1[171] [0]	X1[0] [0]	X1[0] [1]	.....	X1[0] [9]	D[1] [172]	D[1] [173]	.....	D[1] [343]	H2[6] [0]	H2[6] [1]	.....	H2[6] [9]
D[1] [0]	D[1] [1]	.....	D[1] [171]	H1[6] [0]	H1[6] [1]	.....	H1[6] [9]	D[1] [516]	D[1] [517]	.....	D[1] [687]	H2[7] [0]	H2[7] [1]	.....	H2[7] [9]
D[1] [344]	D[1] [345]	.....	D[1] [515]	H1[7] [0]	H1[7] [1]	.....	H1[7] [9]	D[1] [1892]	D[1] [1893]	.....	D[1] [2063]	H2[11] [0]	H2[11] [1]	.....	H2[11] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[1] [1720]	D[1] [1721]	.....	D[1] [1891]	H1[11] [0]	H1[11] [1]	.....	H1[11] [9]	V2[0] [0]	V2[1] [0]	.....	V2[171] [0]	X2[0] [0]	X2[0] [1]	.....	X2[0] [9]
D[2] [0]	D[2] [1]	.....	D[2] [171]	H1[12] [0]	H1[12] [1]	.....	H1[12] [9]	D[2] [172]	D[2] [173]	.....	D[2] [343]	H2[12] [0]	H2[12] [1]	.....	H2[12] [9]
D[2] [344]	D[2] [345]	.....	D[2] [515]	H1[13] [0]	H1[13] [1]	.....	H1[13] [9]	D[2] [516]	D[2] [517]	.....	D[2] [687]	H2[13] [0]	H2[13] [1]	.....	H2[13] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[2] [1720]	D[2] [1721]	.....	D[2] [1891]	H1[17] [0]	H1[17] [1]	.....	H1[17] [9]	D[2] [1892]	D[2] [1893]	.....	D[2] [2063]	H2[17] [0]	H2[17] [1]	.....	H2[17] [9]
V1[0] [1]	V1[1] [1]	.....	V1[171] [1]	X1[1] [0]	X1[1] [1]	.....	X1[1] [9]	D[3] [172]	D[3] [173]	.....	D[3] [343]	H2[18] [0]	H2[18] [1]	.....	H2[18] [9]
D[3] [0]	D[3] [1]	.....	D[3] [171]	H1[18] [0]	H1[18] [1]	.....	H1[18] [9]	D[3] [516]	D[3] [517]	.....	D[3] [687]	H2[19] [0]	H2[19] [1]	.....	H2[19] [9]
D[3] [344]	D[3] [345]	.....	D[3] [515]	H1[19] [0]	H1[19] [1]	.....	H1[19] [9]	D[3] [1892]	D[3] [1893]	.....	D[3] [2063]	H2[23] [0]	H2[23] [1]	.....	H2[23] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[3] [1720]	D[3] [1721]	.....	D[3] [1891]	H1[23] [0]	H1[23] [1]	.....	H1[23] [9]	V2[0] [1]	V2[1] [1]	.....	V2[171] [1]	X2[1] [0]	X2[1] [1]	.....	X2[1] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30] [0]	D[30] [1]	.....	D[30] [171]	H1[180] [0]	H1[180] [1]	.....	H1[180] [9]	D[30] [172]	D[30] [173]	.....	D[30] [343]	H2[180] [0]	H2[180] [1]	.....	H2[180] [9]
D[30] [344]	D[30] [345]	.....	D[30] [515]	H1[181] [0]	H1[181] [1]	.....	H1[181] [9]	D[30] [516]	D[30] [517]	.....	D[30] [687]	H2[181] [0]	H2[181] [1]	.....	H2[181] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[30] [1720]	D[30] [1721]	.....	D[30] [1891]	H1[185] [0]	H1[185] [1]	.....	H1[185] [9]	D[30] [1892]	D[30] [1893]	.....	D[30] [2063]	H2[185] [0]	H2[185] [1]	.....	H2[185] [9]
V1[0] [15]	V1[1] [115]	.....	V1[171] [15]	X1[15] [0]	X1[15] [1]	.....	X1[15] [9]	D[31] [172]	D[31] [173]	.....	D[31] [343]	H2[186] [0]	H2[186] [1]	.....	H2[186] [9]
D[31] [0]	D[31] [1]	.....	D[31] [171]	H1[186] [0]	H1[186] [1]	.....	H1[186] [9]	D[31] [516]	D[31] [517]	.....	D[31] [687]	H2[187] [0]	H2[187] [1]	.....	H2[187] [9]
D[31] [344]	D[31] [345]	.....	D[31] [515]	H1[187] [0]	H1[187] [1]	.....	H1[187] [9]	D[31] [1892]	D[31] [1893]	.....	D[31] [2063]	H2[191] [0]	H2[191] [1]	.....	H2[191] [9]
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
D[31] [1720]	D[31] [1721]	D[31] [1891]	H1[191] [0]	H1[191] [1]	H1[191] [9]	V2[0] [15]	V2[1] [15]	V2[171] [15]	X2[15] [0]	X2[15] [1]	X2[15] [9]

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FIG. 12

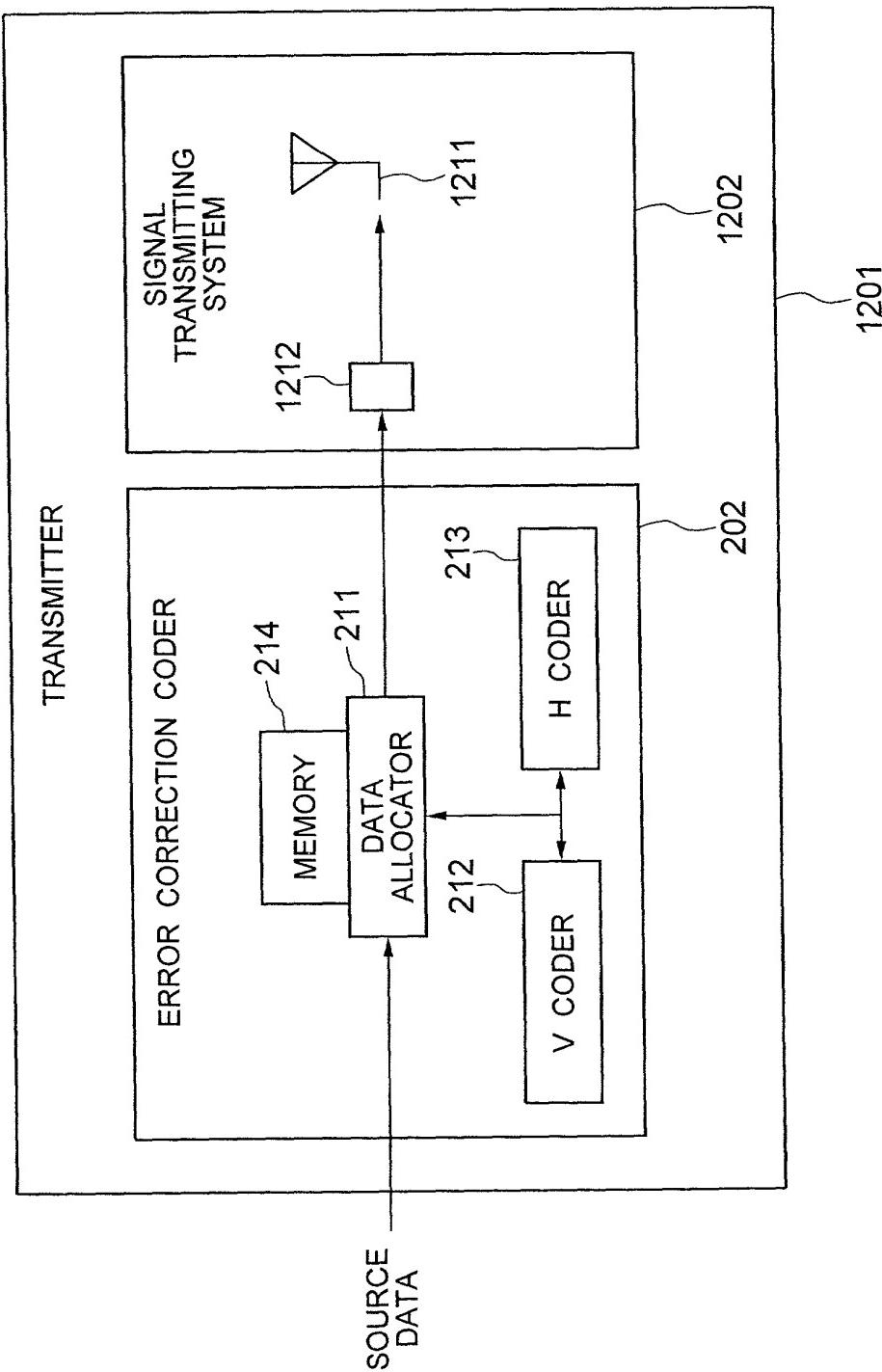


FIG. 13

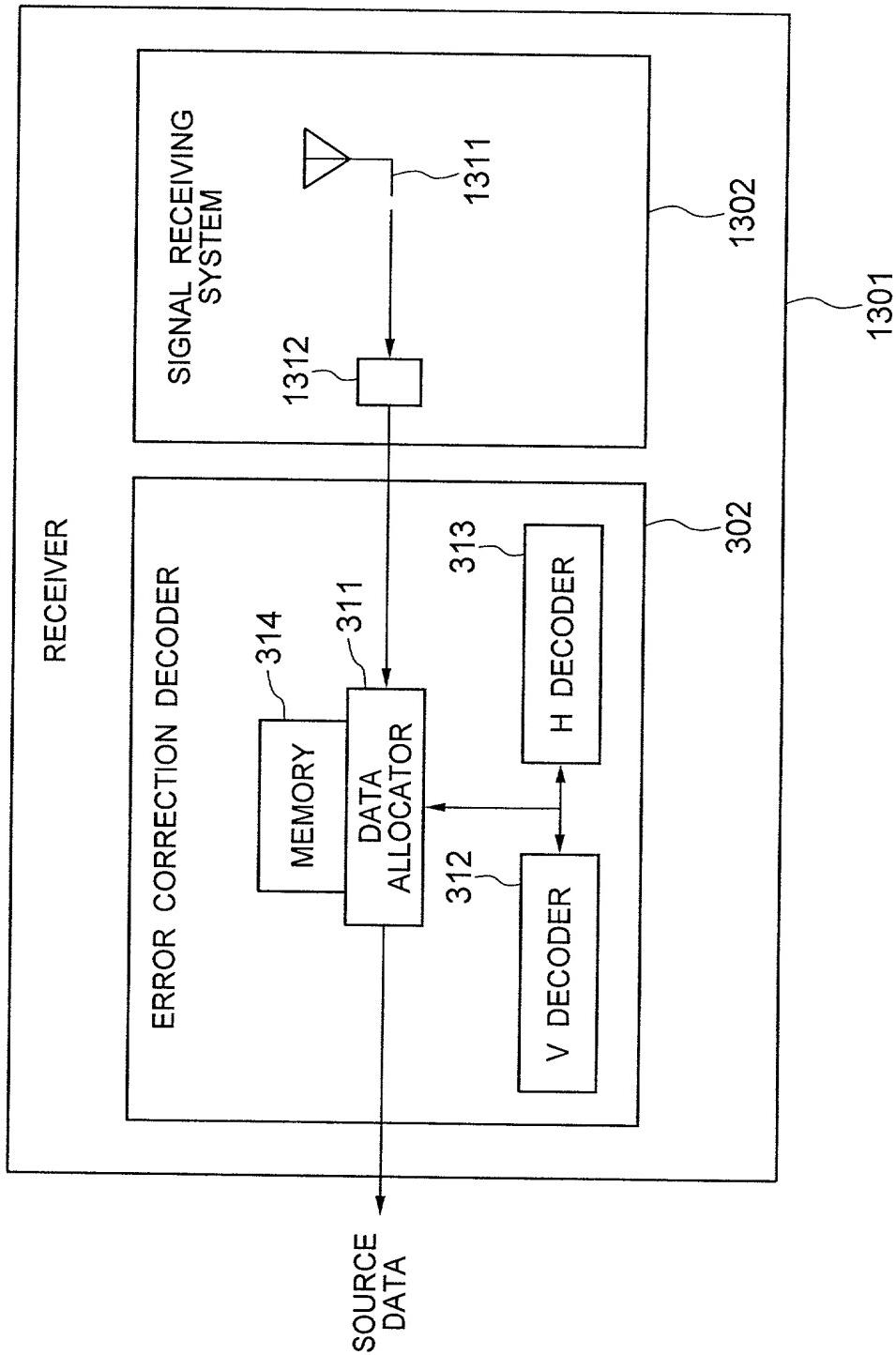
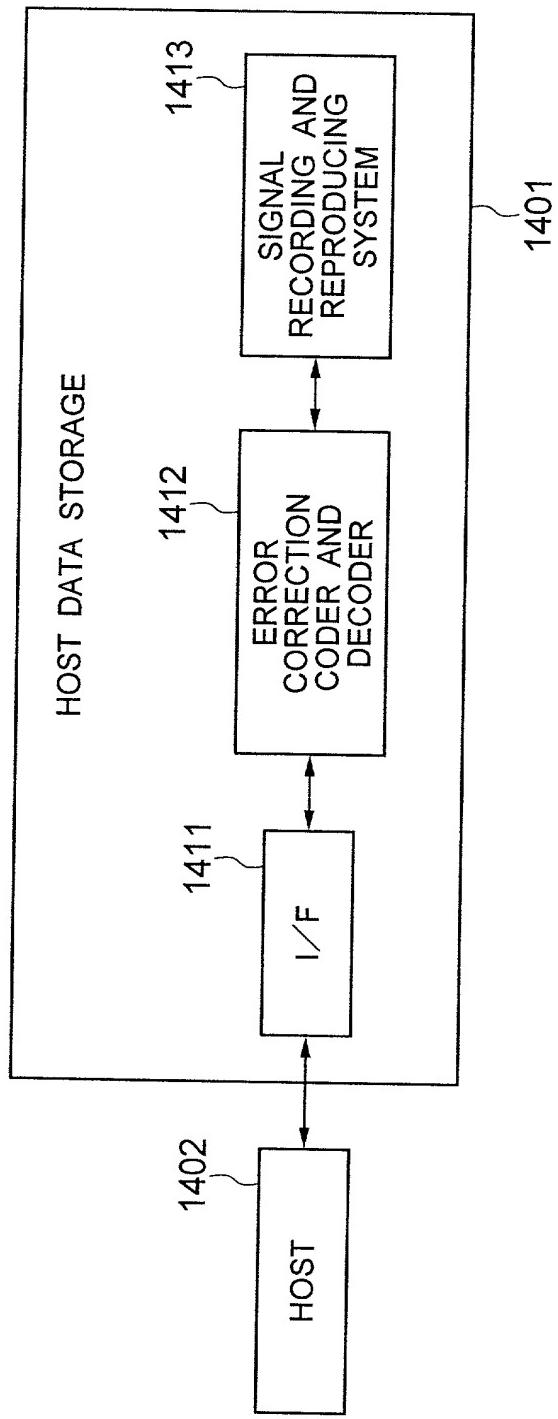


FIG. 14



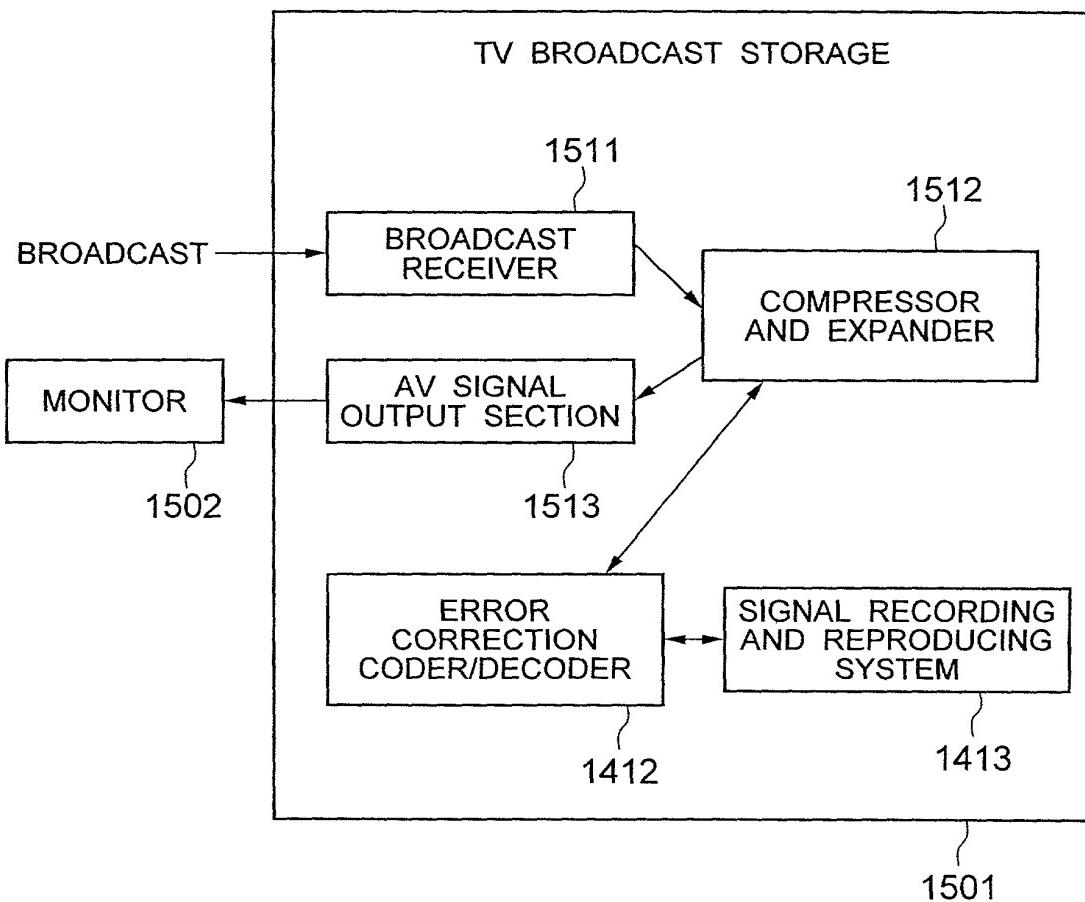
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FIG.15



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FIG.16

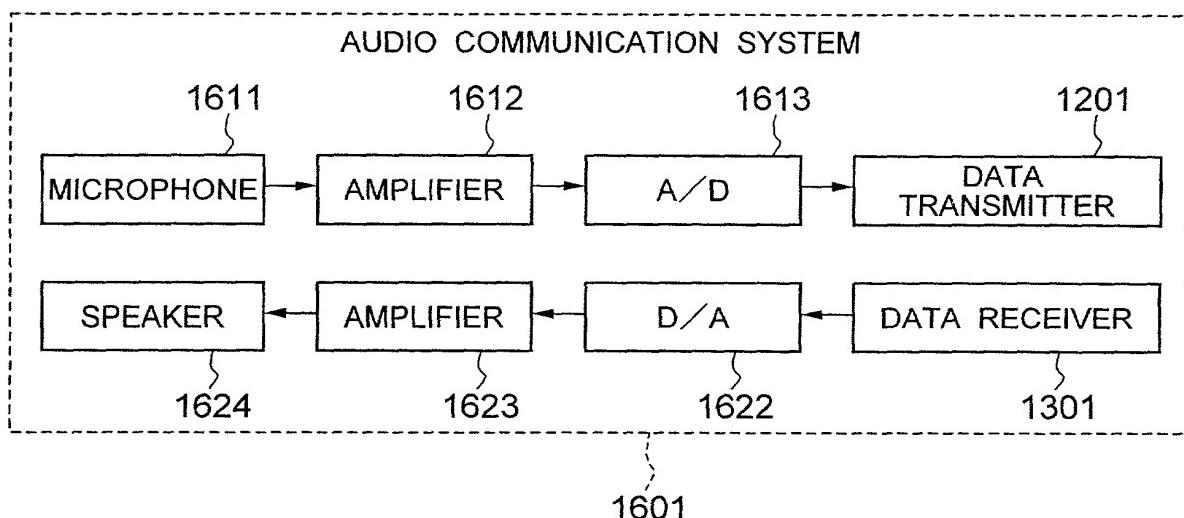


FIG.17

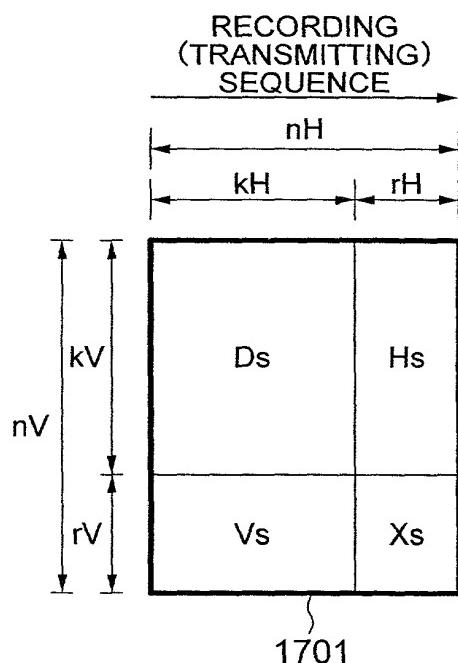


FIG.18

